

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of
RADIAN CORPORATION

Request for the Allocation of
Two MHz in the 914-16 MHz Band
for the Co-Secondary Use of Wind
Profiler Radar Systems

RM-8092

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

ORIGINAL
FILE

To: The Commission

OPPOSITION TO PETITION FOR RULEMAKING

EnScan, Inc. ("EnScan"), pursuant to Section 1.405 of the Commission's Rules and the Commission's Public Notice, Report No. 1909 (Oct. 1, 1992), hereby opposes the above-captioned Petition For Rulemaking, which was filed by Radian Corporation ("Radian").

I. INTRODUCTION

Radian has developed wind profiler radar systems that can be used to predict the onset of thunderstorms and other weather phenomena; detect wind shear conditions in the vicinity of airports; and study pollutants such as acid rain. Radian has proposed that the Commission allocate the frequencies 914-916 MHz to wind profiler radar systems on a co-secondary basis. As discussed below, Radian's Petition should be denied because wind profilers operating on the frequencies 914-916 MHz would interfere with a wide variety of Part 15 devices, including those marketed by EnScan.

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II. INTEREST OF ENSCAN

EnScan manufactures and distributes automatic meter reading ("AMR") equipment. AMR devices that operate in the 910-920 MHz band have been used by gas and electric public utilities, and have been marketed by EnScan, since the mid-1980s. These devices represent a low cost alternative to manual methods of collecting gas meter data.

The three components of the EnScan's AMR system are: (1) the encoder receiver transmitter ("ERT®") unit, which responds to a "wake-up" signal by transmitting information from a utility meter to a receiver; (2) the DataCommand® Unit ("DCU"), which transmits the wake-up signal and receives the information that is transmitted by the ERT units; and (3) the ReadOne® Pro Unit, which is used to program ERT units as they are installed on individual meters.

The ERT units and ReadOne units are Part 15 devices. The Commission has certified the ERT units for operation on the frequencies 910-920 MHz, and the ReadOne units for operation on 915 MHz and 952 MHz. The DataCommand units operate as multiple address system ("MAS") stations in the 956 MHz band pursuant to Part 94 of the Commission's Rules. The Commission expressly modified its MAS rules in 1988 to permit the use of MAS frequencies by AMR systems, finding that AMR systems are "a valuable use of spectrum" that have "the potential to benefit customers by reducing billing problems, increasing the accuracy of meter readings, and, ultimately, lowering utility bills." 900

MHz Multiple Address Frequencies, 3 F.C.C. Rcd. 1564, 1568 (1988).

During the past six years, over 1.6 million ERT units have been installed on the homes and businesses of customers throughout the United States. Demand for AMR products in the 910-920 MHz band has risen sharply over the past few years, and existing EnScan contracts will bring the total of installed ERT units to over 4 million units. The potential for future growth is enormous; utilities have installed over 180 million gas, electric, and water meters in the United States alone.

Before AMR, utilities could read about 200-400 meters per person during an eight-hour shift. During the same eight-hour shift, EnScan's AMR systems read 24,000 meters. AMR has proven particularly popular in colder parts of the country where meters are typically found inside customer dwellings.

Utilities demand high standards of reliability, accessibility and accuracy for AMR systems. Utilities expect, and EnScan's system is designed to provide, reliability on the order of 99.3-99.6%. Signal strength and data integrity are therefore critical.

III. WIND PROFILERS OPERATING ON 914-916 MHZ
WILL CAUSE INTERFERENCE.

Radian states that it is "unlikely" that wind profiler radar systems operating on 914-916 MHz will cause interference to other communications devices. Petition at 8. According to Radian, the only users sharing these frequencies are licensees in the Industrial, Scientific and Medical ("ISM") and Amateur Radio

Services, and Radian argues that the users in these services will not receive interference because: (1) wind profiler radar systems will be "located in isolated, unpopulated areas," and (2) "wind profilers are designed to radiate . . . with low level side lobe emissions." Id. Radian's interference analysis is flawed in virtually every respect.

First, Radian has overlooked the fact that there are vast numbers of certificated Part 15 devices operating in the 902-928 MHz band, which includes the frequency 914-916 MHz. When the Commission made these frequencies available for use by Part 15 devices in the late 1980s, it found its action would "provide major benefits to both manufacturers and consumers" and create the opportunity for "many new and practical uses." Revision of Part 15 (Notice of Proposed Rulemaking), 2 F.C.C. Rcd. 6135, 6137 (1987); Revision of Part 15 (First Report & Order), 66 R.R.2d 295, 308 (1989). Numerous Part 15 devices, including AMR systems, wireless local area networks, and other spread spectrum systems, now make use of these frequencies. As low power devices, these systems are acutely susceptible to interference, and Radian's proposal imperils their viability.

Second, Radian's assertion notwithstanding, wind profilers will not be confined to isolated, unpopulated areas. To the contrary, one of the principal uses for wind profiler radar systems is to detect wind shear in the vicinity of airports. Petition at 4-5. Airports in many metropolitan areas are located in close proximity to commercial and residential developments

where communications equipment can be found and many AMR systems are in use.

Third, Radian's statement that wind profilers have low side lobe emissions is erroneous. The side lobes have an EIRP of 42 dBm, which is 43 dB above the signal strength of the fundamental emissions for EnScan's Part 15 devices. See attached Engineering Statement. Given this disparity, wind profiler devices operating at 914-916 MHz would cause devastating interference to EnScan and other Part 15 users in the 902-928 MHz band. Id.

In sum, the likelihood that wind profiler radar systems will interfere with co-channel users is substantial, and there is a large universe of users on whom such interference would wreak havoc. Indeed, according to the materials that are appended to Radian's Petition, when wind profilers were operated in the 400 MHz band, their side lobe emissions interfered to a substantial degree with NOAA's Search and Rescue Satellite Aided Tracking network. Petition, Appendix C, p. 3.¹


¹ Radian's appendices also demonstrate that Radian has proposed inappropriate frequencies for wind profiler radar systems. According to these appendices, rain has a large, adverse impact on the functioning of wind profiler radar systems operating at approximately 1 GHz. Appendix A, p. A-8. By way of contrast, Radian's materials show that rain would only have a moderate and small impact, respectively, on operations in the 400 MHz and 50 MHz bands. Radian is proposing a frequency allocation for wind profiler radar systems that is near 1 GHz, and two of the principal uses of the system involve rainy conditions: detecting thunderstorms and studying airborne pollutants such as acid rain. It is self-evident that equipment is intended to be operated during rainstorms should not be allocated frequencies at which rain severely impairs the operation of the equipment.

CONCLUSION

For the foregoing reasons, Radian's Petition should be denied.

Respectfully submitted,

ENSCAN, INC.

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Its Attorneys

November 2, 1992

ENGINEERING STATEMENT OF JOHN W. MACCONNELL

1. I am a senior principal engineer at Itron, Inc. ("Itron"), which is the parent company of EnScan, Inc. ("EnScan"). I have extensive experience in the design and operation of radio systems. Prior to joining Itron, I was a co-founder of Pacific R & D, a company that specialized in the design of complete communications systems, RF simulators, transmitters, receivers, and frequency synthesizers. Before co-founding Pacific R & D, I was a member of the technical staff at the Jet Propulsion Laboratory, and was extensively involved with the analysis, design, and fabrication of RF communications and planetary radar tracking systems. I hold a B.S.E.E. from the University of California Berkeley; have been published in seven technical journals; and have received three NASA technical awards.

2. I am providing this Engineering Statement in support of an Opposition that EnScan is filing against a Petition for Rulemaking that was filed by Radian Corporation ("Radian"). In its filing, Radian identifies four antenna options:

- 1 by 2 meter antenna (gain = 23.7 dB)
- 3 by 1 meter antenna (gain = 25.4 dB)
- 2 by 2 meter antenna (gain = 26.7 dB)
- 3 by 3 meter antenna (gain = 30.2 dB)

For purposes of argument, I have used the 3 by 3 meter antenna option and compared it to an antenna mentioned in the supporting material provided along with Radian's filing, since this will

give the most favorable result to Radian. This data is for the Tycho Model 400. This is a 400 MHz antenna with 35.6 dB of gain. If their 3 by 3 meter antenna is properly constructed, it could have performance approaching that of the Tycho Model 400.

3. The data provided by Radian shows side lobe emissions of approximately -50 dB from the main lobe at angles nearing the horizontal. Since these are computed values, not measured values, the emissions in practice (considering the fact that these are phased array antennas) are likely to be higher, even taking into account the fences around the antennas. In any event, using the computed values, the EIRP in the main lobe is: +57 dBm (transmitter power) + 35 dB (antenna gain) = 92 dBm EIRP. The EIRP in their side lobe is 50 dB less, or: 92 dBm EIRP (main lobe) - 50 dB (side lobe attenuation) = 42 dBm (side lobe EIRP). The EIRP of a transmitter running 50,000 microvolts per meter is approximately -1.3 dBm. That means that EnScan's equipment (as well as other low power users) will face a signal that is 43 dB stronger, and therefore will experience overwhelming interference.

4. I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge, information, and belief.



John W. MacConnell

Date: November 2, 1992

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing Opposition to Petition for Rulemaking was sent by first-class mail, postage prepaid, this 2nd day of November, 1992, to the following:

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/s/ Laurie A. Gray
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